

# Natural Community Characterization

## Granite Reliable Power's proposed Wind Power project in Coos County, New Hampshire

May 2008



### PREPARED FOR

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### PREPARED BY

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**Stantec**

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## **1.0 INTRODUCTION AND PROJECT HISTORY**

In March 2008, Stantec Consulting (Stantec; formerly Woodlot Alternatives, Inc.) completed additional characterizations and mapping of the natural communities and wildlife habitats associated with the proposed Granite Reliable Power Wind Power project in Coos County, New Hampshire (project; see Figure Index). Granite Reliable Power, LLC (Granite) currently proposes to construct approximately 33 wind turbines located on approximately 6 miles of ridgeline, approximately 9 miles of new access roads to the turbine locations, and approximately 12 miles of electrical interconnection line corridor located along existing roadways.

To date, Stantec has completed a variety of natural resource surveys and assessments associated with the proposed project area. These surveys and assessments include: a fall 2006 nocturnal radar survey, a winter 2007 track survey, a spring 2007 wetland and vernal pool reconnaissance survey, a spring and fall 2007 nocturnal radar survey, spring, summer, and fall 2007 acoustic bat surveys, a spring and summer 2007 rare plant reconnaissance survey, and a fall 2007 raptor migration survey.

In addition to characterizing and evaluating the natural communities and wildlife habitats within the project area, Stantec investigated sites with similar natural community and wildlife habitat features within the surrounding landscape that could potentially be used as mitigation for the alteration of existing habitats from the proposed project.

## **2.0 METHODOLOGY**

### **2.1 Existing Data Review and Landscape Analysis**

Prior to conducting field surveys, Stantec reviewed relevant existing natural resource data and high resolution aerial photographs available for the project site. This data review and landscape analysis was used to target field surveys within the different natural communities and wildlife habitats that are present within the project area.

In addition, the data review and landscape analysis identified areas with similar natural resource characteristics within the surrounding landscape that may function as suitable mitigation sites for the alteration of habitats within the project area.

Field maps were generated using high resolution aerial photographs in order to allow for efficient field navigation and orientation.

### **2.2 Field Survey**

The various natural communities and wildlife habitats identified during the landscape analysis were subsequently visited during the field survey. Field maps and a handheld Global Positioning System (GPS) unit were used to navigate through the project's natural community areas. Within each area visited, data was collected on existing vegetation, current ecological condition, and wildlife use. Natural communities were identified based on the classification developed by the New Hampshire Natural Heritage Bureau and The Nature Conservancy<sup>1</sup>. Representative photographs were taken as appropriate (Appendix A).

### **2.3 Natural Community Mapping**

Utilizing high resolution digital aerial photographs provided by Granite Reliable Power, the boundaries of the various natural communities present within the proposed impact areas of the project site were sketched onto field maps and subsequently digitized using Geographic Information System (GIS)

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<sup>1</sup> Sperduto, D.D. and W.F. Nichols. 2004. Natural Communities of New Hampshire. New Hampshire Natural Heritage Bureau and The Nature Conservancy. Concord, NH.

software (Figures 1-17). Stantec did not conduct wetland delineations within the project area during these field surveys. All wetland boundaries presented on the attached figures are approximate. Furthermore, only large-scale wetland natural communities were mapped. Smaller wetlands, such as drainage swales, wet skidder trails, or non-natural wetlands, were not identified as part of this mapping task. Furthermore, stream boundaries were not identified during field surveys.

### 3.0 RESULTS

Stantec conducted field surveys between March 24 and March 27, 2008. It is important to note that over 3.5 feet of snow was present throughout the project area during these field surveys. As such, observations of herbaceous vegetation or small shrubs were largely not possible. Similarly, many species of wildlife that likely use these communities and habitats on a seasonal basis (e.g., migratory birds) were not observable. This report uses results of prior field investigations to provide further information about each natural community and wildlife habitat within the project area. This section describes the ecological characteristics associated with the four separate peaks and ridgelines proposed for development within the project area: the Dixville Peak area, Mt. Kelsey, Owlhead Mountain, and an unnamed ridgeline to the south of Owlhead Mountain (hereafter referred to as the Fish Brook Ridge), as well as the proposed electrical interconnection line corridor along Dummer Pond Road. Representative photographs are included in Appendix A.

#### 3.1 Dixville Peak Area

The Dixville Peak area includes eight wind turbines proposed along the high elevation ridge to be located in softwood stands including seedlings and saplings, pole sized, and saw log stands. The summit of Dixville Peak (3,450 feet) is characterized as a High-Elevation Balsam Fir Forest. Balsam fir (*Abies balsamea*) is the dominant tree present within this area with an exceptionally dense stocking density. The summit is windswept with pole sized stunted balsam fir trees reaching maximum heights of approximately 20 to 25 feet (6 to 8 m). The summit of the mountain has limited evidence of human activity; however, some vegetation clearing for a multi-use access road to the peak has occurred. Below 3,300' in elevation, the forest transitions into a High-Elevation Spruce-Fir Forest dominated by pole sized trees of balsam fir and red spruce (*Picea rubens*) with heart-leaf paper birch (*Betula cordifolia*) scattered throughout the community. Understory vegetation includes regeneration of canopy species. While the herbaceous stratum was snow-covered at the time of the March 2008 field survey, common herbaceous species that are expected to occur include goldthread (*Coptis trifolia*), mountain wood-sorrel (*Oxalis montana*), Canada mayflower (*Maianthemum canadense*), bluebead-lily (*Clintonia borealis*), and starflower (*Trientalis borealis*). Areas of windthrow and human disturbances have created pockets of balsam fir and red spruce regeneration. This community is intact with limited evidence of recent anthropogenic disturbances (i.e., timber harvesting).

These high-elevation communities present on Dixville Peak provide suitable habitat for high-elevation specialist species of wildlife including Bicknell's thrush (*Catharus bicknelli*) and blackpoll warbler (*Dendroica striata*), as well as coniferous forest specialists including spruce grouse (*Falcipennis canadensis*), bay-breasted warbler (*Dendroica castanea*), boreal chickadee (*Parus hudsonicus*), dark-eyed junco (*Junco hyemalis*), gray jay (*Perisoreus canadensis*), and American marten (*Martes americana*).

The proposed development of wind turbines, access roads, and electrical interconnection line corridors on Dixville Peak will result in approximately 9.9 acres of impacts to the High-Elevation Balsam Fir Forest and 15.3 acres of impact to the High-Elevation Spruce-Fir Forest.

#### 3.2 Mt. Kelsey Area

Eight wind turbines are proposed along the ridgeline of Mt. Kelsey. These turbines would be located in softwood and mixed stands. Similar to Dixville Peak, the higher elevations (i.e., generally above 3,000') on Mt. Kelsey are characterized as a High-Elevation Balsam Fir Forest. Pole sized trees, saplings, and

shrubs of balsam fir are dense within this community. The high elevation ridgeline of Mt. Kelsey includes numerous windthrow gaps with exceptionally dense balsam fir regeneration and blowdowns. Recent anthropogenic disturbances from timber harvests are generally absent from the higher elevations on Mt. Kelsey. Below 3,000', the High-Elevation Balsam Fir Forest transitions into a High Elevation Spruce-Fir Forest with pole and saw log sized red spruce, balsam fir, and heart-leaf paper birch as the dominant tree species. The understory is generally more open than within the higher elevations along the ridgeline. Recent and historic timber harvests have occurred within this community on Mt. Kelsey. Several small forested wetlands were observed during Stantec's reconnaissance-level wetland survey in the spring of 2007.

The communities present within the higher elevation forests on Mt. Kelsey also provide habitat for several specialist species of wildlife including Bicknell's thrush, blackpoll warbler, American marten, bay-breasted warbler, gray jay, boreal chickadee, and Cape May warbler (*Dendroica tigrina*).

The proposed development of wind turbines, access roads, and electrical interconnection line corridors on Mt. Kelsey will result in approximately 11.7 acres of impacts to the High-Elevation Balsam Fir Forest and 16.8 acres of impact to the High-Elevation Spruce-Fir Forest.

### 3.3 Owlhead Mountain Area

Five wind turbines are proposed for the Owlhead Mountain area. The Owlhead Mountain summit is characterized as a High-Elevation Spruce-Fir Forest dominated by pole and saw log sized red spruce and balsam fir. Heart-leaf paper birch and yellow birch (*Betula alleghaniensis*) are scattered throughout the canopy. Recent and historical timber harvests have occurred throughout most the community including the presence of an existing access road to the southern summit. Below the summit along the ridgeline, the forests transitions into a second growth Northern Hardwood-Spruce-Fir-Forest dominated by pole and saw log sized red spruce, balsam fir, yellow birch, paper birch (*Betula papyrifera*), and sugar maple (*Acer saccharum*). Based on previous Stantec field surveys, dominant species present within the forest understory include regeneration of canopy species, hobblebush (*Viburnum lantanoides*), mountain maple (*Acer spicatum*), evergreen wood fern (*Dryopteris intermedia*), and bluebead-lily (*Clintonia borealis*). Evidence of recent and active timber harvests is present throughout this second growth community around the mountain and along the proposed access roads and electrical interconnection line corridors. Several small forested wetlands are located along the ridgeline of Owlhead Mountain, including at least one vernal pool as documented by Stantec in the spring of 2007.

Past field surveys by Stantec, as well as the New Hampshire Audubon Society, have demonstrated that the forests on Owlhead Mountain are used by a wide range of wildlife species including: moose (*Alces alces*), white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), snowshoe hare (*Lepus americanus*), fisher (*Martes pennanti*), American marten, red squirrel (*Tamiasciurus hudsonicus*), black bear (*Ursus americanus*), wood frog (*Rana sylvatica*), spotted salamander (*Ambystoma maculatum*), and numerous resident and migratory birds such as red-tailed hawk (*Buteo jamaicensis*), black-capped chickadee (*Parus atricapillus*), yellow-bellied flycatcher (*Epidonax flaviventris*), veery (*Catharus fuscescens*), Swainson's thrush (*Catharus ustulatus*), yellow-rumped warbler (*Dendroica coronata*), dark-eyed junco, black-throated green warbler (*Dendroica virens*), and hairy woodpecker (*Picodes villosus*).

The proposed development of wind turbines, access roads, and electrical interconnection line corridors on Owlhead Mountain will result in approximately 2.7 acres of impacts to High-Elevation Spruce-Fir Forest.

### 3.4 Fish Brook Ridge Area

The Fish Brook Ridge is approximately 2,800' in elevation at the highest peak at the northern end of the ridge. Twelve wind turbines are currently proposed for the ridgeline. The majority of the ridgeline and lower elevations have been substantially disturbed through past timber harvests, including both clearcuts and selective shelter cuts. The southern portion of the ridgeline includes regenerating clearcuts

dominated by saplings and shrubs of balsam fir, yellow birch, showy mountain-ash (*Sorbus decora*), red spruce, and paper birch. Residual pole or saw log sized trees are located throughout the clearcut areas. The central and northern portions of the ridgeline have been selectively harvested for timber with many larger diameter trees retained along the ridge.

The dominant natural community present along the central portion of ridgeline is characterized as a second growth Northern Hardwoods-Spruce-Fir Forest. Most of this forested community along the ridgeline and lower elevations has been harvested for timber in recent years. A few small stands on steeper slopes off of the ridge have been less disturbed. Dominant trees include saw log sized red spruce, balsam fir, paper birch, yellow birch, sugar maple, and red maple (*Acer rubrum*). Understory species include striped maple (*Acer pensylvanicum*), mountain maple, and hobblebush. Common herbaceous plants that were observed during previous Stantec field surveys include red raspberry (*Rubus idaeus*), starflower, Canada mayflower, bluebead-lily, evergreen wood fern, large-leaved goldenrod (*Solidago macrophylla*), and shining firmoss (*Huperzia lucidula*). Numerous trees of paper birch are dead or dying along the ridgeline. The increased mortality is likely due to increased wind exposure, a result of timber harvesting along the ridgeline.

The northern summit along the ridge is characterized as a High-Elevation Spruce-Fir Forest dominated by pole sized red spruce and balsam fir. The community is more intact, with limited evidence of recent anthropogenic disturbances. Steep slopes occur on the eastern, western, and northern side of this peak.

The lower elevations of the ridge, including areas along the proposed access roads and electrical interconnection line corridor, are characterized as a second growth Sugar Maple-Beech-Yellow Birch Forest. This community is dominated by pole and saw log sized sugar maple, paper birch, yellow birch, beech (*Fagus grandifolia*), and hop-hornbeam (*Ostrya virginiana*). Recent and historic timber harvests have occurred throughout these areas.

Based on Stantec's reconnaissance-level wetland survey in spring 2007, the Fish Brook Ridge includes several small wetlands, including at least 5 vernal pools. Many wetlands have been disturbed through past forestry activities. The southern portion of the ridge includes an approximately 15-acre Red Spruce Bog natural community. This forested wetland is dominated by trees of red spruce with a pit and mound understory. A small stream flows northwesterly through the wetland into a tributary stream of Phillips Brook. The stream was frozen at the time of the March 2008 field survey.

The Fish Brook Ridge provides habitat for numerous species of specialist and generalist species of wildlife. Species that occur or are likely to occur within this area include: moose, white-tailed deer, marten, fisher, coyote, wood frog, spotted salamander, white-footed mouse (*Peromyscus leucopus*), red fox (*Vulpes vulpes*); a multitude of migratory and resident bird species may also occur in the area including: black-throated green warbler, black throated blue warbler (*Dendroica caerulescens*), Blackburnian warbler (*Dendroica fusca*), olive-sided flycatcher (*Contopus cooperi*), yellow-bellied flycatcher, least flycatcher (*Empidonax minimus*), hermit thrush (*Catharus guttatus*), Swainson's thrush, black-capped chickadee, red tailed hawk, common raven (*Corvus corax*), ruffed grouse (*Bonasa umbellus*), spruce grouse, northern flicker (*Colaptes auratus*), red-eyed vireo (*Vireo olivaceus*), eastern wood-pewee (*Contopus virens*), brown creeper (*Certhia americana*), golden-crowned kinglet (*Regulus satrapa*), and white-throated sparrow (*Zonotrichia albicollis*). In addition, the Red Spruce Bog wetland present near the southern summit provides suitable habitat for the rare northern bog lemming (*Synaptomys borealis*).

The proposed development of wind turbines, access roads, and electrical interconnection line corridors along the Fish Brook Ridge will result in approximately 1.99 acres of impacts to High-Elevation Spruce-Fir Forest at the northern end of the ridge.

### 3.5 Dummer Pond Road Proposed Electrical Interconnection Line Corridor

Below the high elevation forests, the proposed electrical interconnection line corridors pass through

industrial forest land that has been substantially influenced by past and present forest management activities. Regenerating clearcuts and second growth Northern Hardwoods-Spruce-Fir Forests characterize the habitats within these lower elevation areas. Most areas have been harvested recently and include networks of abandoned skidder trails, log landings, and gravel access roads interspersed among clearcuts and regenerating stands. Dominant tree species throughout this area include sugar maple, beech, balsam fir, yellow birch, paper birch, red spruce, and hop-hornbeam. The understory largely consists of regenerating canopy species within the sapling and shrub strata, along with shrubs of hobblebush, striped maple, fly honeysuckle (*Lonicera canadensis*), and mountain maple. Common herbaceous species observed throughout these areas during previous Stantec field surveys include evergreen wood fern, shining firmoss, whorled aster (*Oclemena acuminata*), red raspberry, purple trillium (*Trillium erectum*), Canada mayflower, starflower, and Christmas fern (*Polystichum acrostichoides*). Regenerating clearcuts are common along the proposed electrical interconnection line corridors.

Some areas along the proposed electrical interconnection line corridor transition from a mixed forest community to a hardwood-dominated community characterized as Sugar Maple-Beech-Yellow Birch Forests. These areas have lesser amounts of red spruce and balsam fir throughout the community. Similar to the mixed forests, all portions of these areas have been harvested for timber in the past. These areas do not represent unique or otherwise exceptional communities or habitats within the region. Such communities and habitats are extremely common throughout northern New Hampshire.

The proposed electrical interconnection line corridor follows along Phillips Brook and crosses several of the tributary streams draining into Phillips Brook. Small forested and scrub-shrub wetland communities are present along Phillips Brook. Trees within these wetlands include species such as red maple, balsam fir, and white ash (*Fraxinus americana*). Common shrub species include speckled alder (*Alnus incana* ssp. *rugosa*), wild raisin (*Viburnum nudum* var. *cassinoides*), and silky dogwood (*Cornus amomum*). The wetlands along Phillips Brook are likely seasonally flooded during the spring months.

#### **4.0 POTENTIAL MITIGATION SITES**

Stantec investigated several potential mitigation sites within the vicinity of the project area that may effectively off-set the alteration of natural communities and wildlife habitat as a result of the proposed development. Efforts were focused on identifying areas that will potentially mitigate for the loss of higher elevation sub-alpine habitats, as these areas are associated with several sensitive species of wildlife, such as Bicknell's thrush or American marten, and are less common throughout the region (Figure 18). Sites were primarily identified and evaluated using remote sensing techniques (i.e., aerial photography analysis). Following are descriptions of the evaluated areas.

##### **4.1 Mt. Kelsey Northeast Ridge**

The ridge extending easterly from the northern summit of Mt. Kelsey includes high elevation fir and spruce-fir forests that are similar to those present within the turbine and access road proposed impact areas. This ridge includes numerous windthrow gaps and dense balsam fir regeneration. The lower elevations include maturing stands of red spruce and balsam fir. Past timber harvests have occurred up to elevations of approximately 3,000'. The preservation of the high elevation forests in this area through conservation easements restricting future timber harvests within sub-alpine communities, future development, or the creation of motorized vehicle trails would effectively offset the impacts to high elevation habitat as a result of the proposed project. Habitat in this area would be maintained for high elevation specialist species of wildlife such as Bicknell's thrush.

##### **4.2 Dixville Peak Southeastern Summit and Ridge**

The southeastern summit of Dixville Peak (3,439' in elevation) is contiguous to the High Elevation Balsam Fir Forest that occurs within the proposed development area on the western summits. High-Elevation Spruce-Fir Forests on steep slopes characterize the areas below the southeastern summit. A review of aerial photographs indicates that these areas in the eastern portion of the mountain are largely

undisturbed. While the steep slopes likely limit opportunities for future timber harvests within sub-alpine communities, the southeast summit and ridge could potentially accommodate future wind power development or motorized recreational vehicle trails. To effectively mitigate for the impacts to the high elevation habitats as a result of the proposed project, the southeastern summit and ridgeline could be appropriately preserved through conservation easements prohibiting future development or motorized trail construction.

#### 4.3 Whitcomb Mountain

Whitcomb Mountain includes High-Elevation Spruce-Fir Forests similar to those present on Dixville Peak and Mt. Kelsey. The mountain includes windthrow gaps with regenerating red spruce and balsam fir that would be suitable for Bicknell's Thrush, as well as several specialist species of birds. The maturing spruce-fir forests on the higher slopes of the mountain provide habitat for American marten. A review of aerial photographs indicates that recent timber harvests have occurred below 3,000' in elevation. Preservation of the higher elevation coniferous forests through conservation easements prohibiting future development or timber harvests within sub-alpine communities would effectively mitigate for impacts to higher elevation habitat present within the project site. Furthermore, portions of Whitcomb Mountain are included within the Nash Stream State Forest. As such, the mitigation opportunities available on Whitcomb Mountain could result in an inclusion of all of the high elevation habitats under conservation management objectives.

### 5.0 CONCLUSIONS

The project area is dominated by natural communities and wildlife habitats that are typical of the northern New Hampshire landscape. The project area includes a forested landscape that has been substantially influenced by past and present forest management activities. Most accessible forest stands have been harvested for timber multiple times over the past 100 years. Mixed forested communities dominate the lower elevation forests. These areas are characterized by a dominance of spruce and fir with a mix of northern hardwood species including sugar maple, yellow birch, paper birch, and American beech. A wide range of wildlife species including large and small mammals, reptiles, amphibians, and migratory and resident bird species use these lower elevation forests throughout the project area.

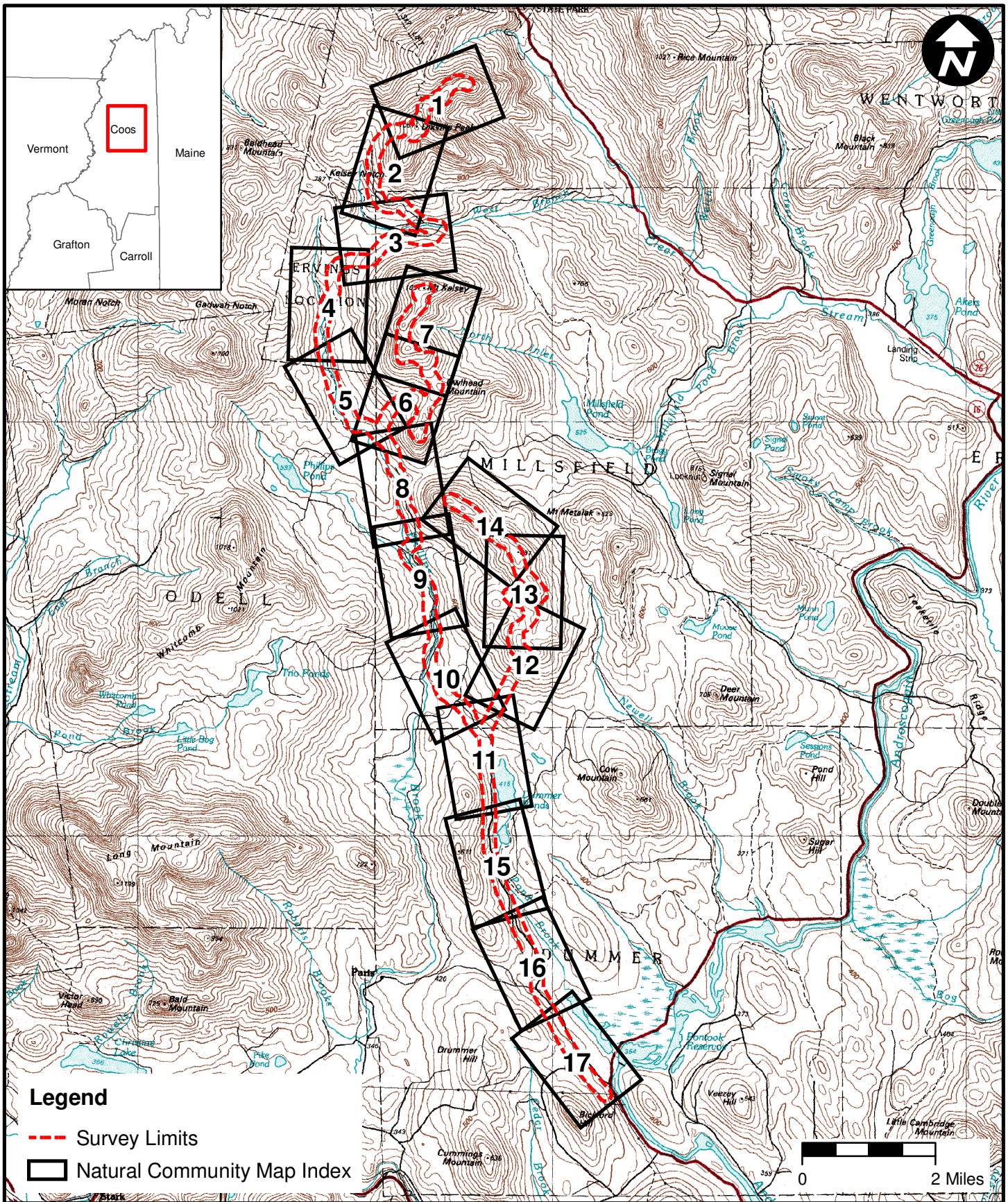
As currently proposed, the development of wind turbines, access roads, and electrical interconnection line corridors on Dixville Peak, Mt. Kelsey, Owlhead Mountain, and the Fish Brook ridge will result in a total of 57.9 acres of impact to high elevation forested habitats, only two percent of the overall total habitat above 2700 feet in elevation (Table 1). The higher elevation spruce and fir-dominated forests provide the more specialized habitat within the project area. These high elevation forests provide habitat for sensitive species such as American marten and Bicknell's thrush, as well as other specialist species such as boreal chickadee, blackpoll warbler, and gray jay. Several high elevation areas on Mt. Kelsey, Dixville Peak, Owlhead Mountain, and the Fish Brook Ridge have been harvested for timber in recent years.

<b>Table 1. Total Acres of Impact to Natural Communities Above 2700' at GRP's Proposed Wind Power Project</b>			
Location	Impact Acres	Total Acres above 2700'	% Of Land Area above 2700'
Dixville Peak	25	1873	1%
Mt. Kelsey	29	1667	2%
Owlhead Mtn	3	49	6%
Fish Brook Ridge	2	158	1%
<b>Total</b>	<b>58</b>	<b>3,747</b>	<b>2%</b>

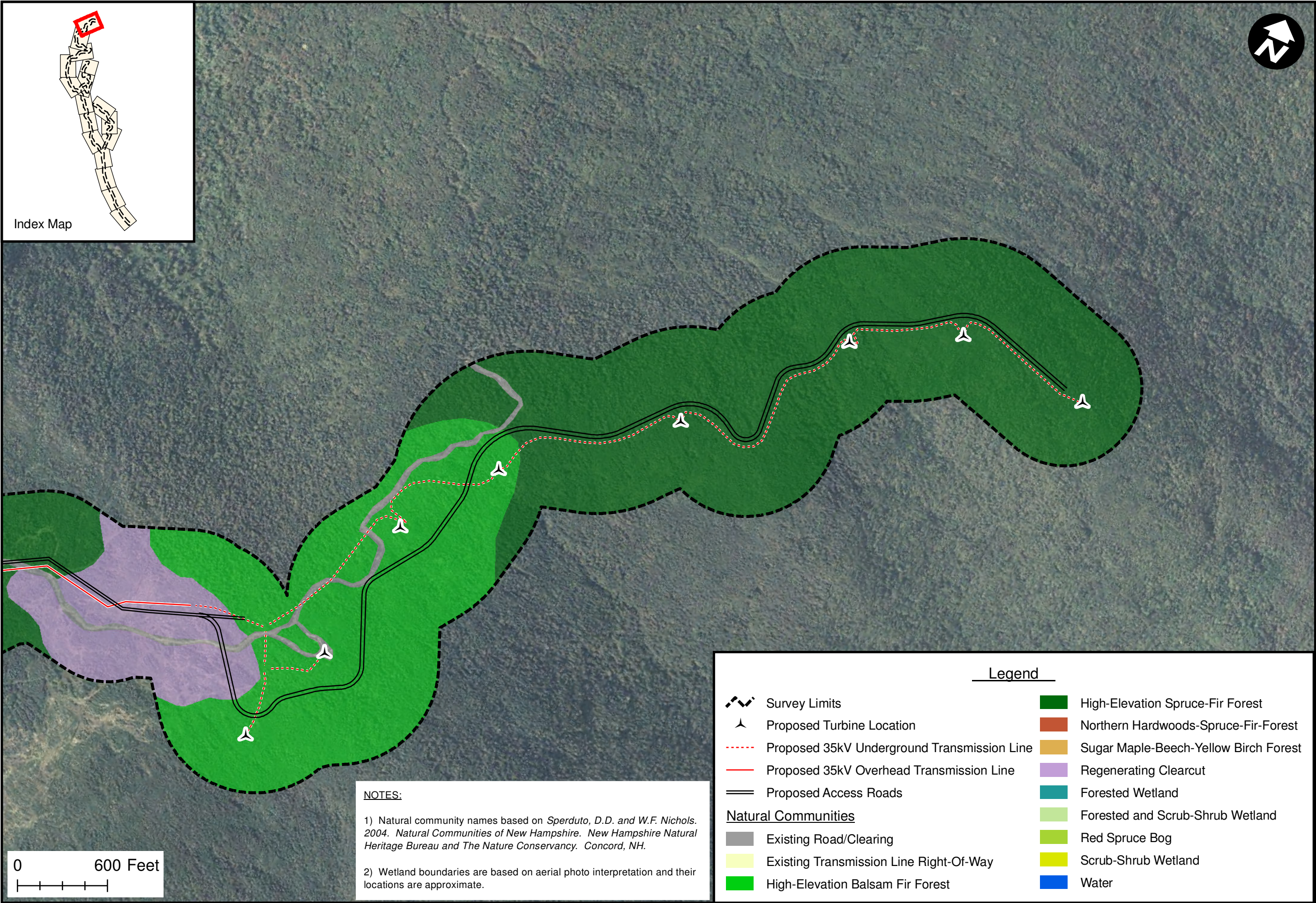
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Several mitigation options exist in the vicinity of the project area. These include additional areas on Dixville Peak and Mt. Kelsey as well as Whitcomb Mountain. The appropriate preservation of additional high elevation forests through easements restricting future development or timber harvests would allow previously disturbed high elevation forests to mature as well as maintain the existing wildlife habitats within the undisturbed stands. Such preservation efforts would effectively compensate for the loss and alteration of existing high elevation habitat as a result of the proposed development.

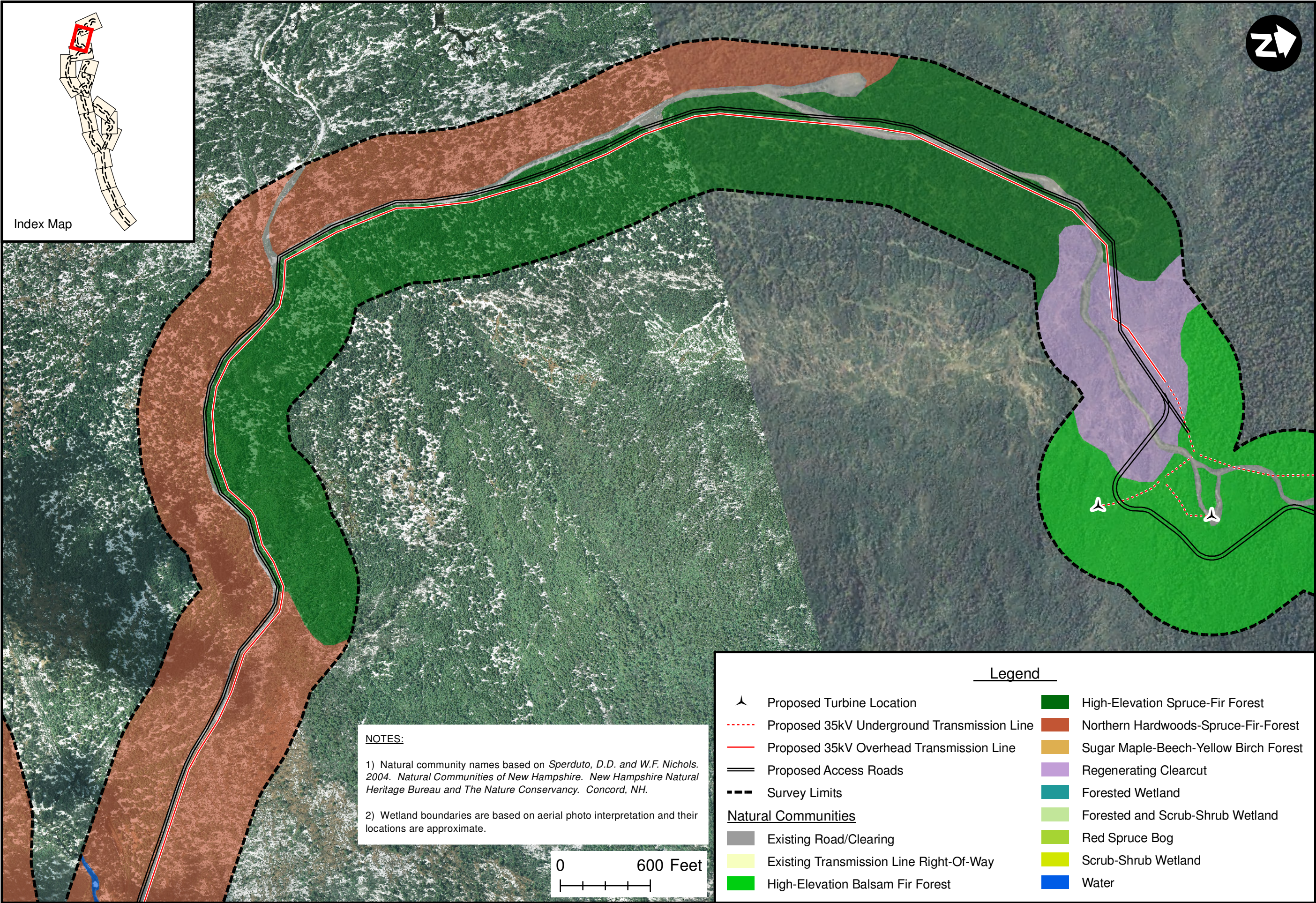




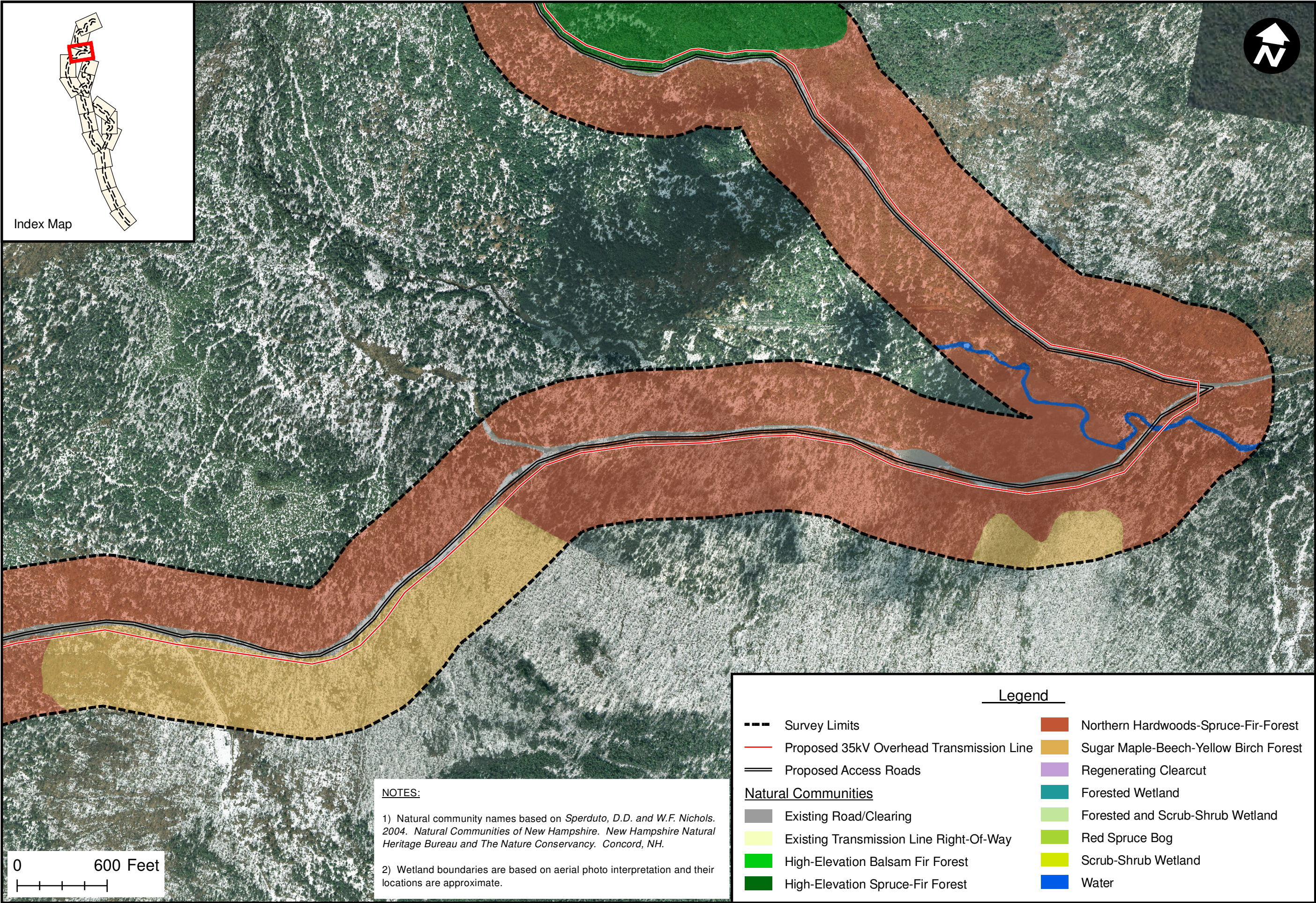




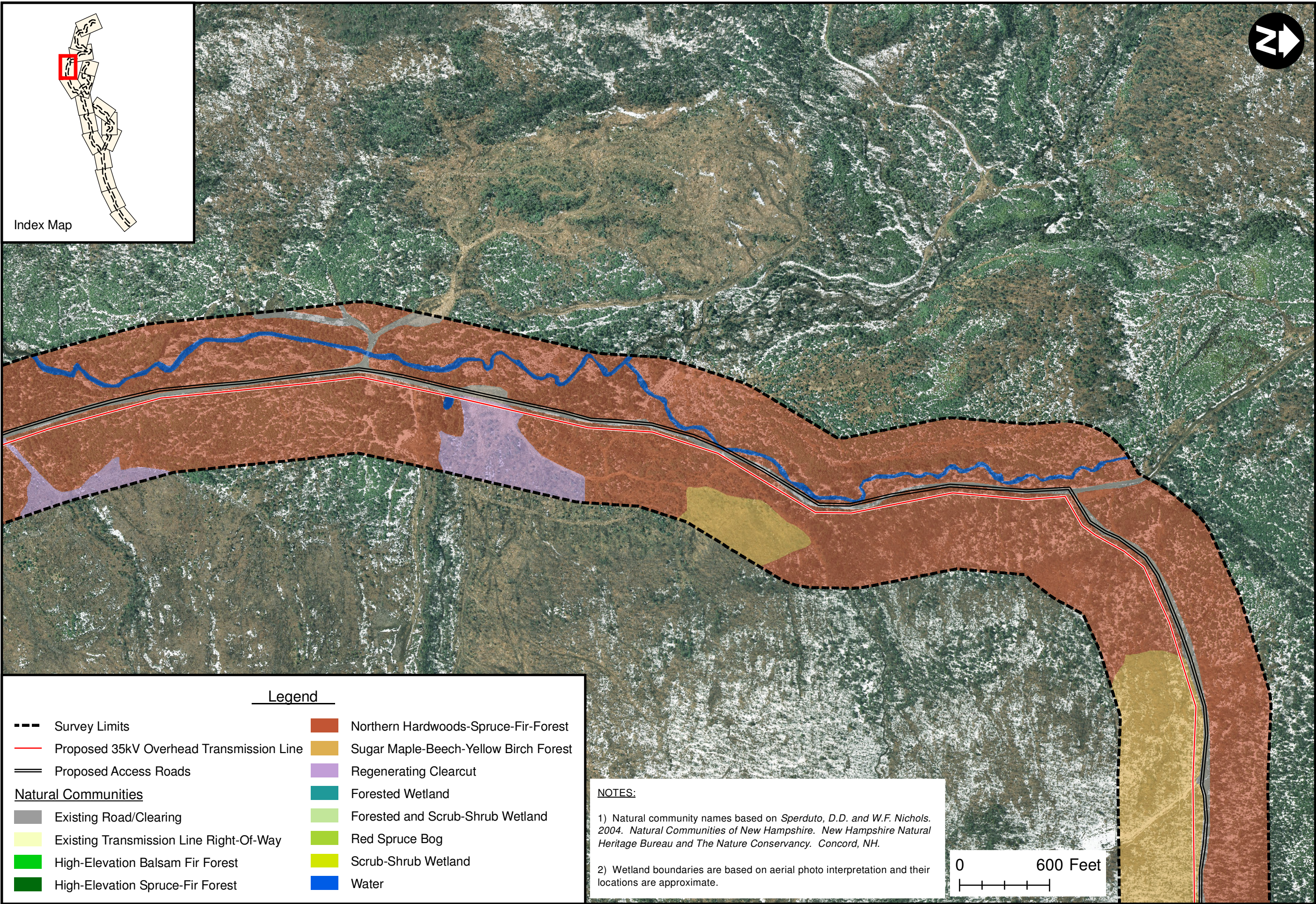




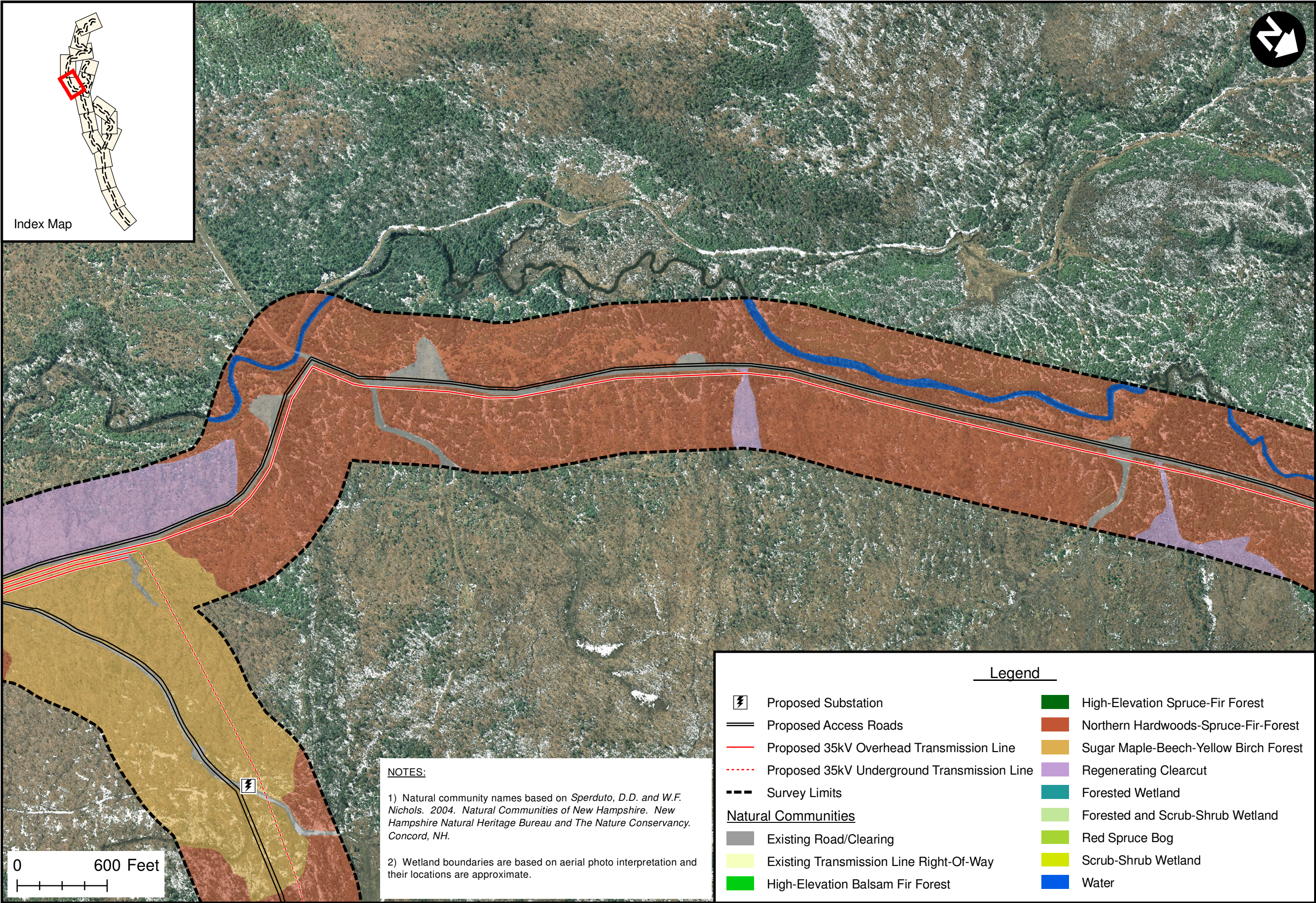




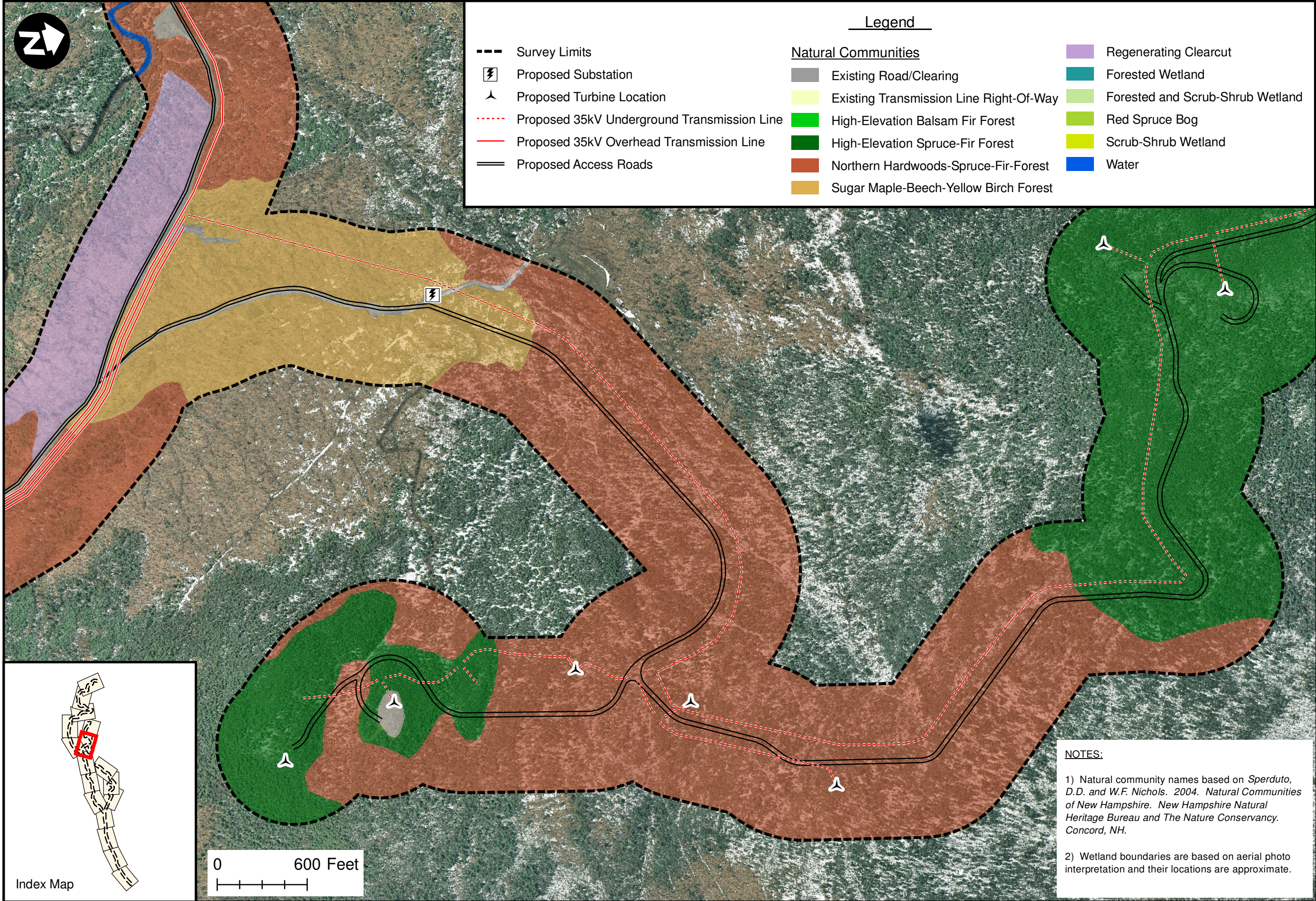












- Survey Limits

Proposed Substation

Proposed Turbine Location

Proposed 35kV Underground Transmission Line

Proposed 35kV Overhead Transmission Line

Proposed Access Roads

Natural Communities

Existing Road/Clearing

Existing Transmission Line Right-Of-Way

High-Elevation Balsam Fir Forest

High-Elevation Spruce-Fir Forest

Northern Hardwoods-Spruce-Fir-Forest

Sugar Maple-Beech-Yellow Birch Forest

Regenerating Clearcut

Forested Wetland

Forested and Scrub-Shrub Wetland

Red Spruce Bog

Scrub-Shrub Wetland

Water

**NOTES:**

1) Natural community names based on *Sperduto, D.D. and W.F. Nichols. 2004. Natural Communities of New Hampshire. New Hampshire Natural Heritage Bureau and The Nature Conservancy. Concord, NH.*

2) Wetland boundaries are based on aerial photo interpretation and their locations are approximate.


Sheet Title:

Natural Community Map  
6 of 17

Project:

Granite Reliable Power Windpark  
Proposed Project in Coos  
County, New Hampshire

Prepared By:

  
106195-F06-NatComm.mxd

Date:

5/15/2008

Scale:

1" = 600'

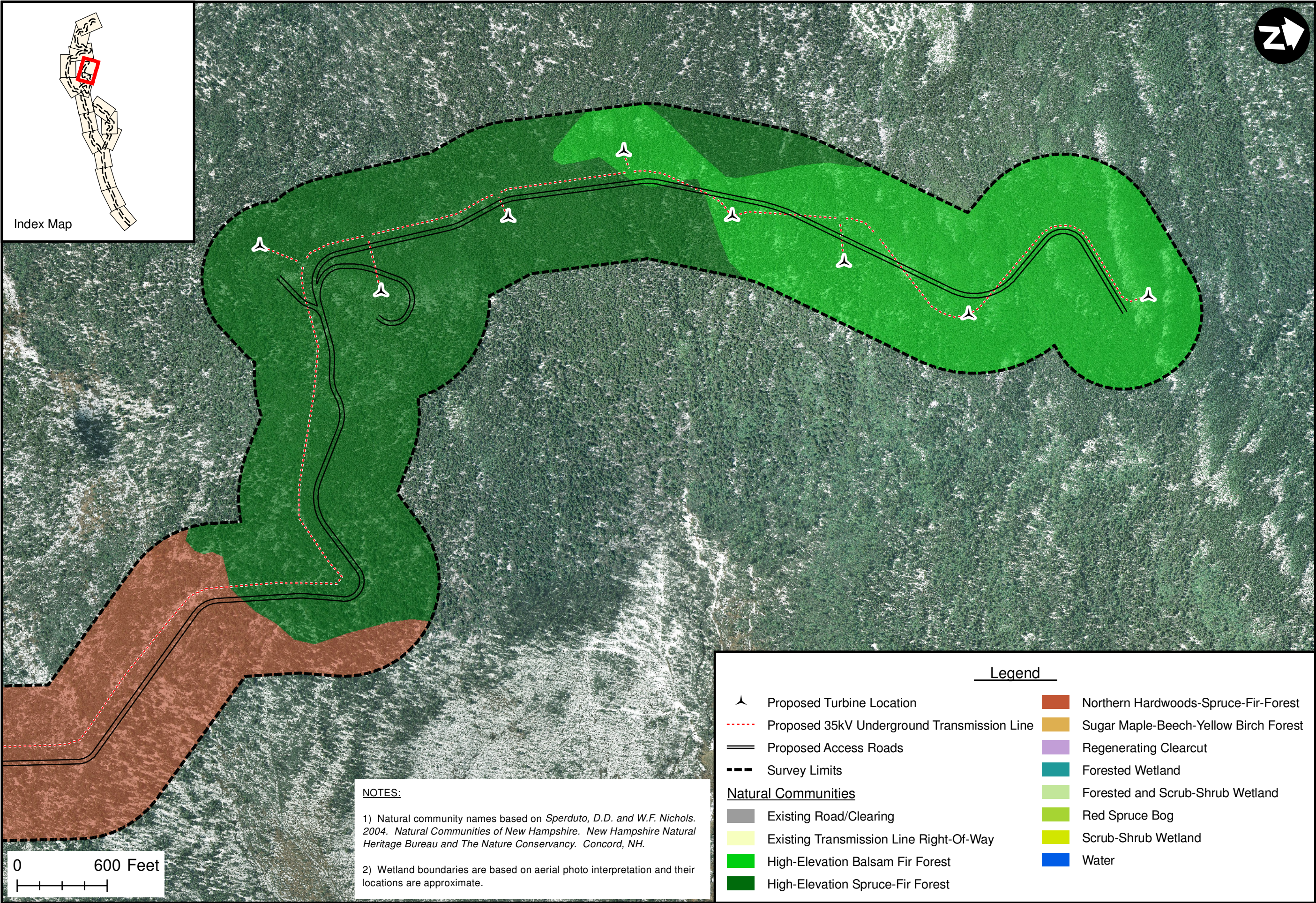
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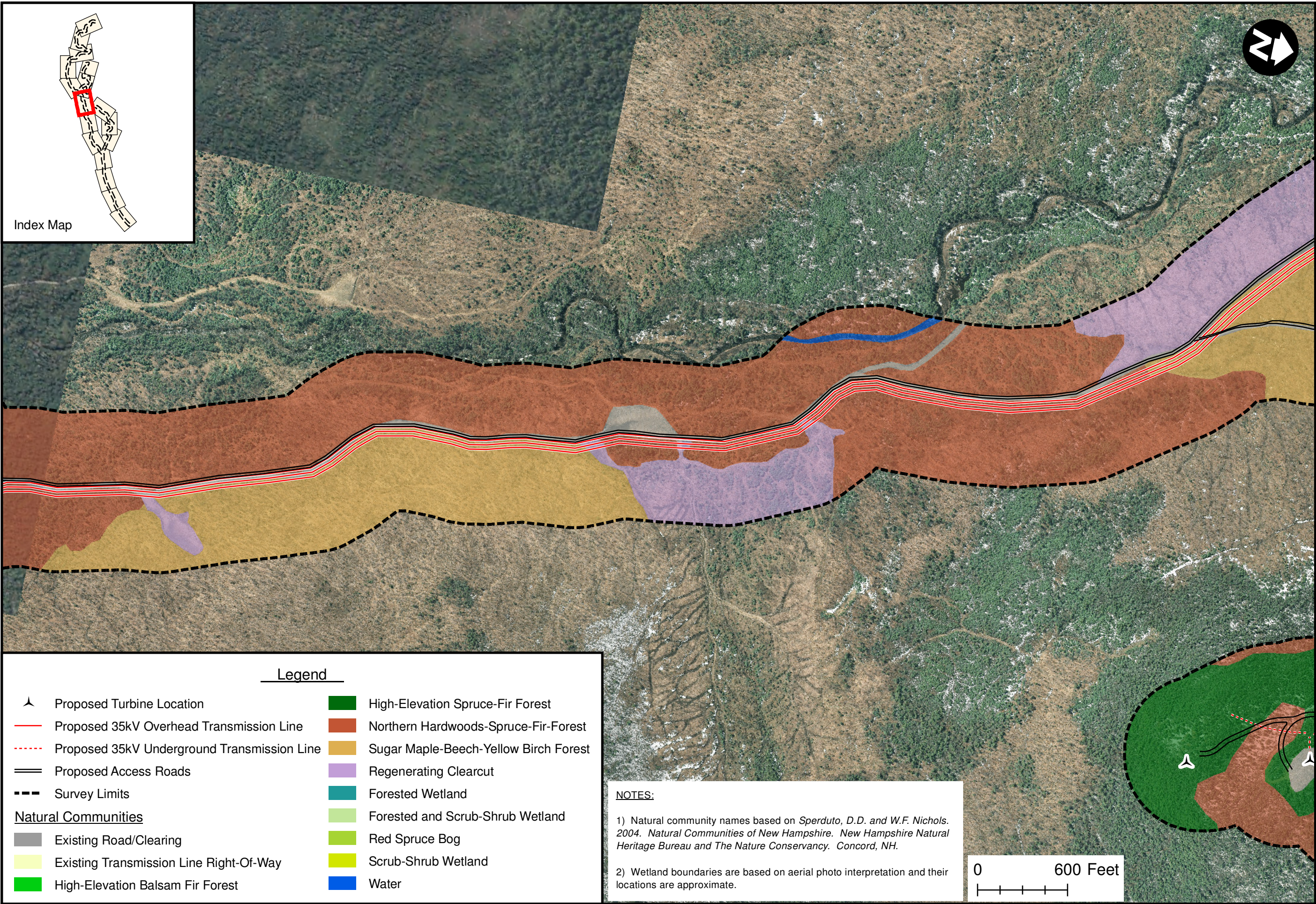
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Sheet Title:

Natural Community Map  
8 of 17

Project:

Granite Reliable Power Windpark  
Proposed Project in Coos  
County, New Hampshire

Prepared By:

  
106195-F08-NatComm.mxd

Date: 5/15/2008

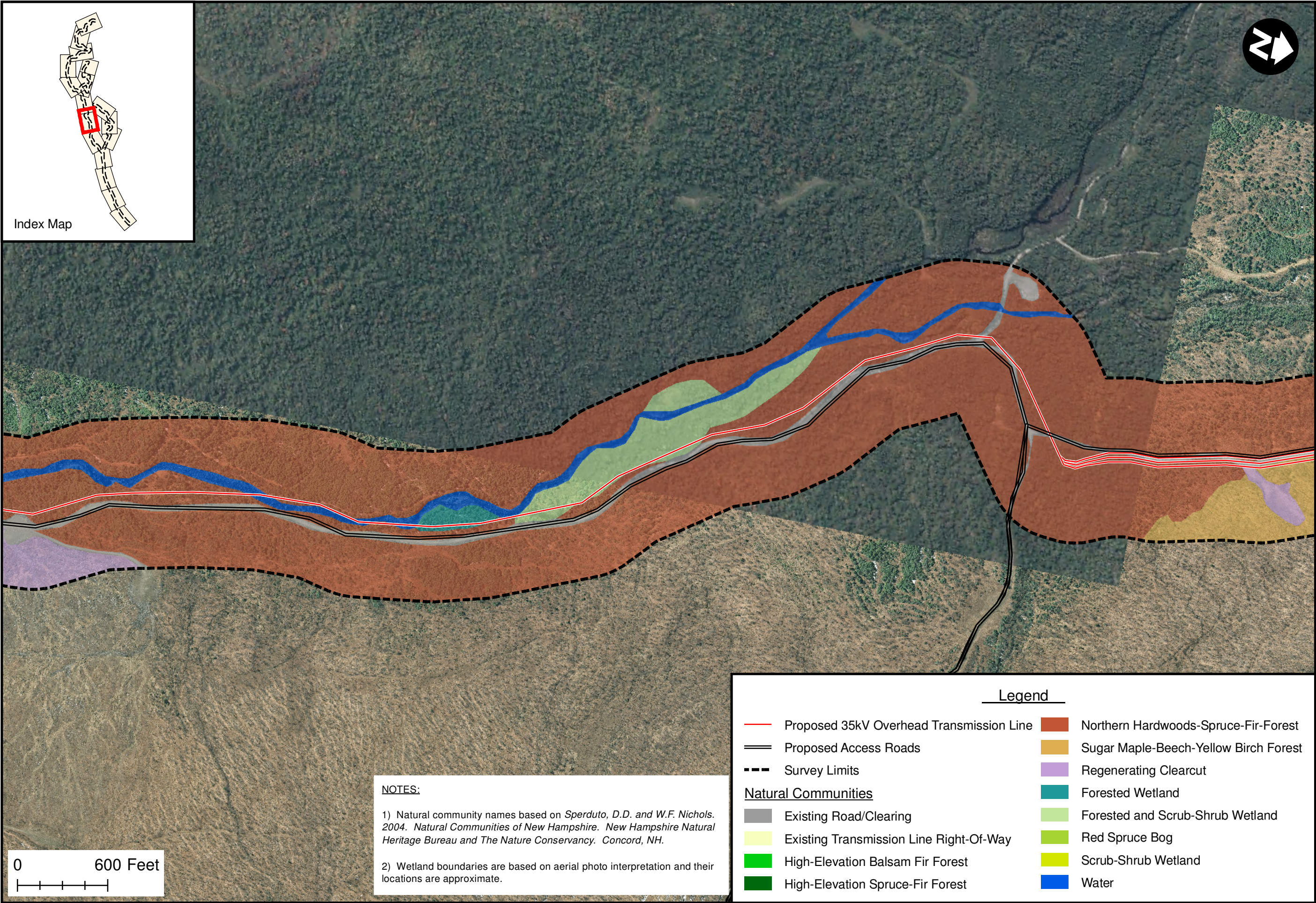
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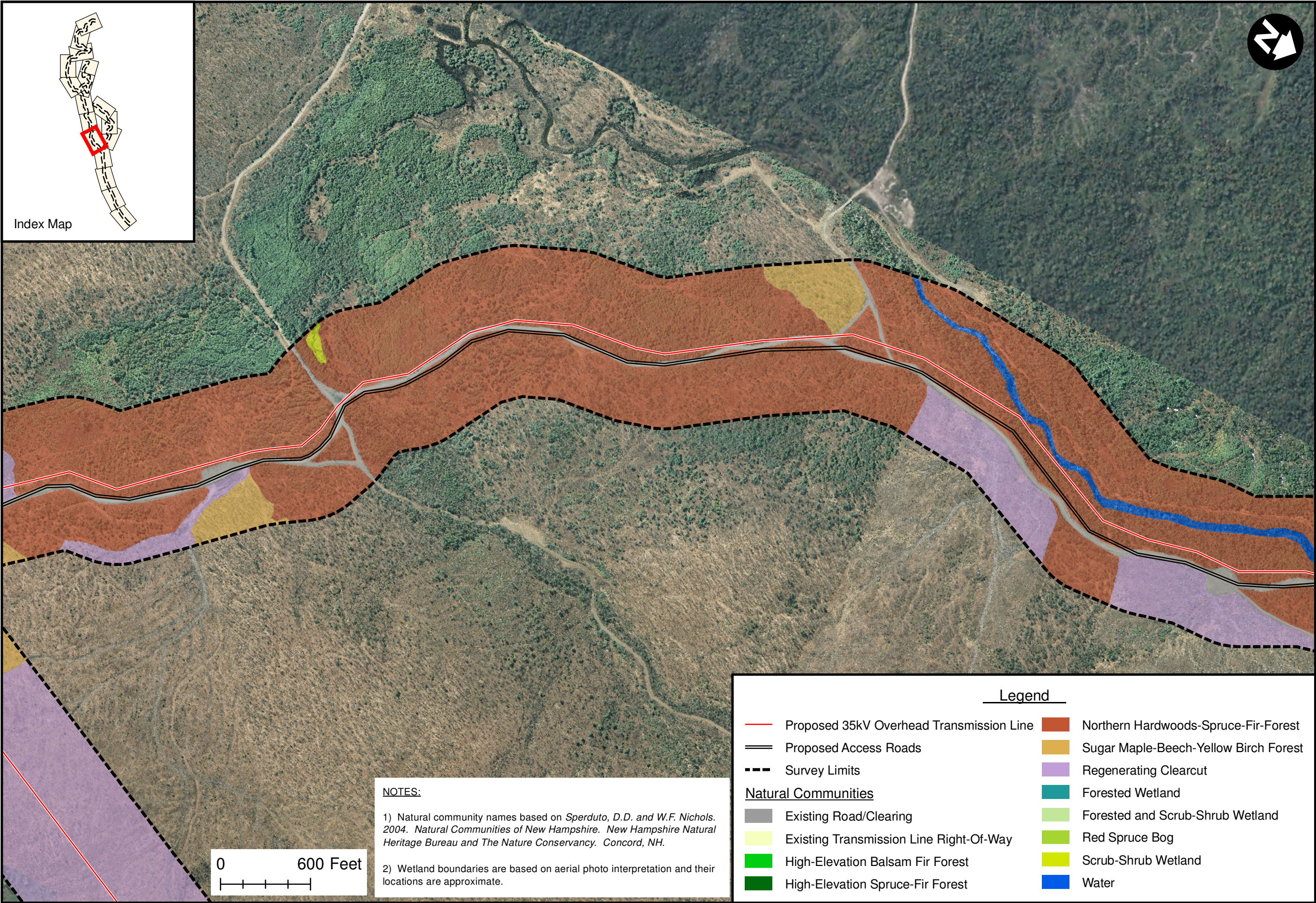
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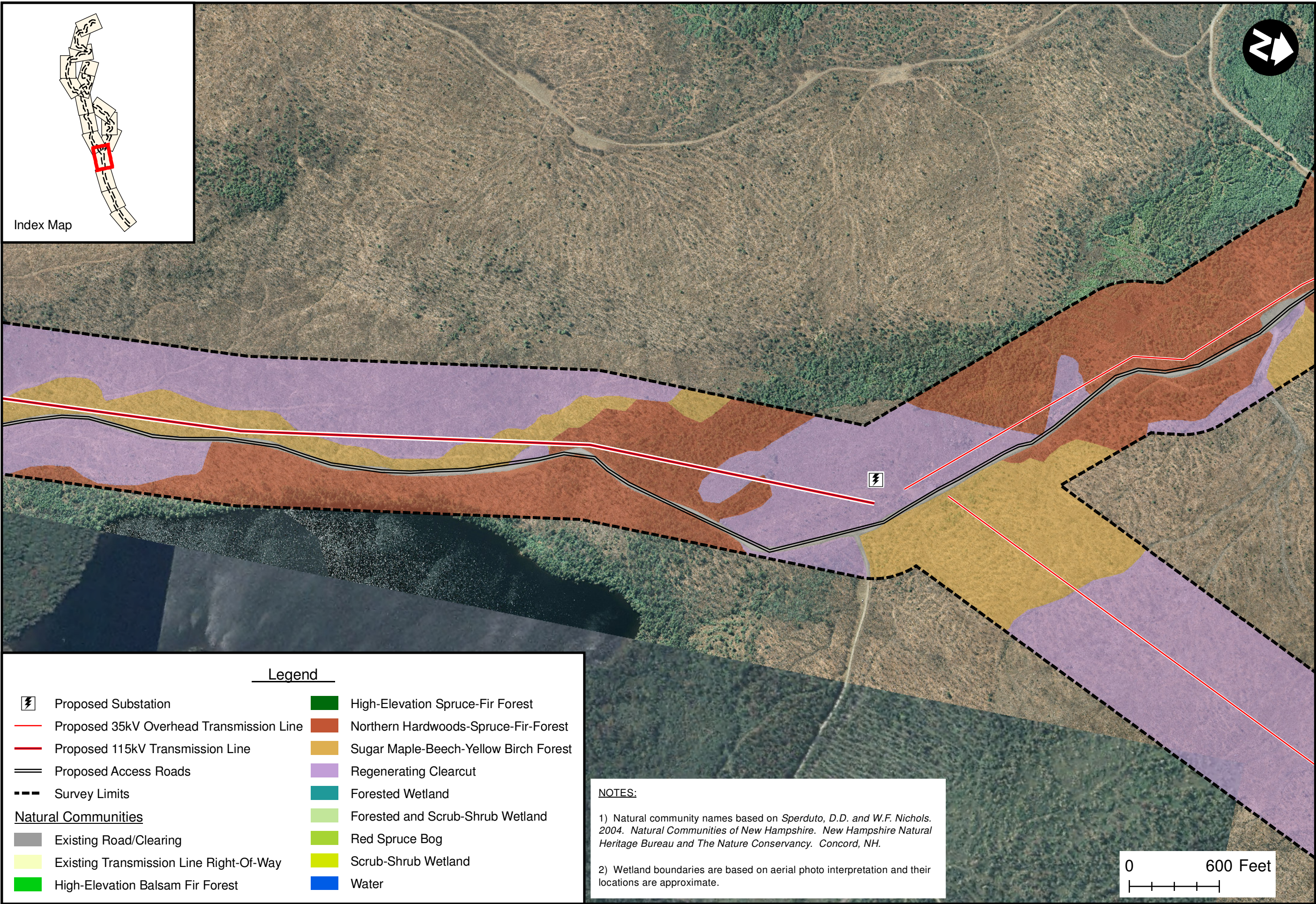




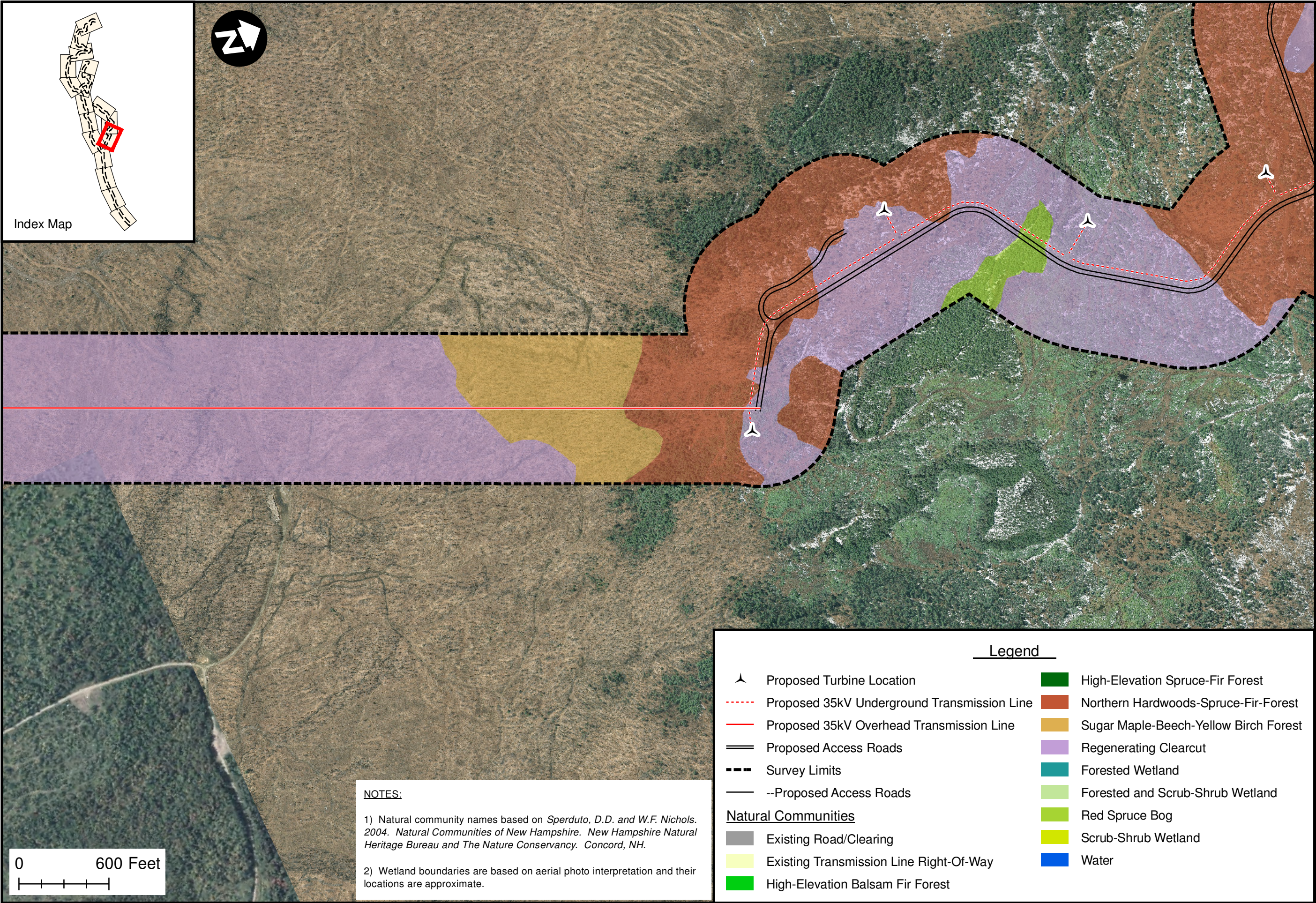




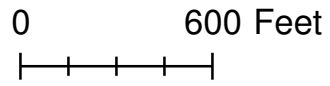








Index Map



**NOTES:**

- 1) Natural community names based on *Sperduto, D.D. and W.F. Nichols. 2004. Natural Communities of New Hampshire. New Hampshire Natural Heritage Bureau and The Nature Conservancy. Concord, NH.*
- 2) Wetland boundaries are based on aerial photo interpretation and their locations are approximate.

**Legend**

- |   |                                       |
|---|---------------------------------------|
| Proposed Turbine Location                   | High-Elevation Spruce-Fir Forest      |
| Proposed 35kV Underground Transmission Line | Northern Hardwoods-Spruce-Fir-Forest  |
| Proposed 35kV Overhead Transmission Line    | Sugar Maple-Beech-Yellow Birch Forest |
| Proposed Access Roads                       | Regenerating Clearcut                 |
| Survey Limits                               | Forested Wetland                      |
| --Proposed Access Roads                     | Forested and Scrub-Shrub Wetland      |
| Existing Road/Clearing                      | Red Spruce Bog                        |
| Existing Transmission Line Right-Of-Way     | Scrub-Shrub Wetland                   |
| High-Elevation Balsam Fir Forest            | Water                                 |

Sheet Title:

Granite Reliable Power Windpark  
Proposed Project in Coos  
County, New Hampshire

Project:

Prepared By:

Date: 5/15/2008

Scale: 1" = 600'

Proj. No.: 195600066

Figure:

Natural Community Map  
12 of 17







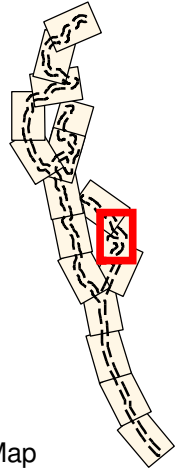
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- 2) Wetland boundaries are based on aerial photo interpretation and their locations are approximate.

**Legend**

Survey Limits	<b>Natural Communities</b>	Northern Hardwoods-Spruce-Fir-Forest	Red Spruce Bog
Proposed Turbine Location	Existing Road/Clearing	Sugar Maple-Beech-Yellow Birch Forest	Scrub-Shrub Wetland
Proposed 35kV Underground Transmission Line	Existing Transmission Line Right-Of-Way	Regenerating Clearcut	Water
Proposed Access Roads	High-Elevation Balsam Fir Forest	Forested Wetland	
	High-Elevation Spruce-Fir Forest	Forested and Scrub-Shrub Wetland	

Index Map



Sheet Title:

Natural Community Map  
13 of 17

Project:

Granite Reliable Power Windpark  
Proposed Project in Coos  
County, New Hampshire

Prepared By:



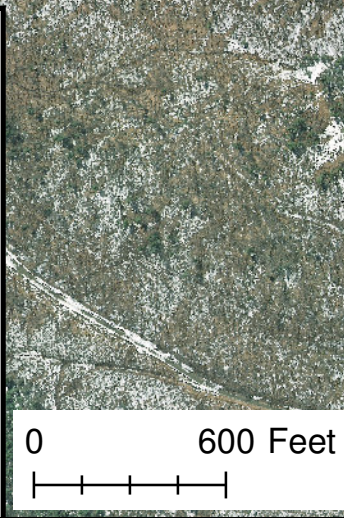
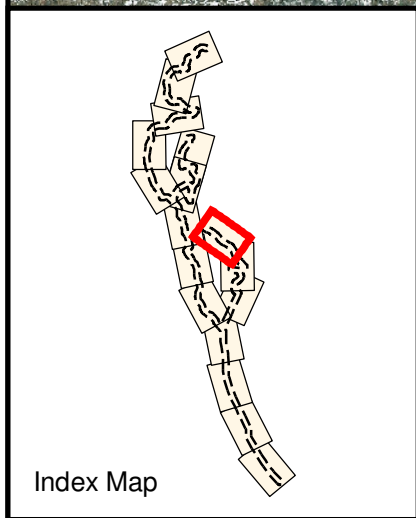
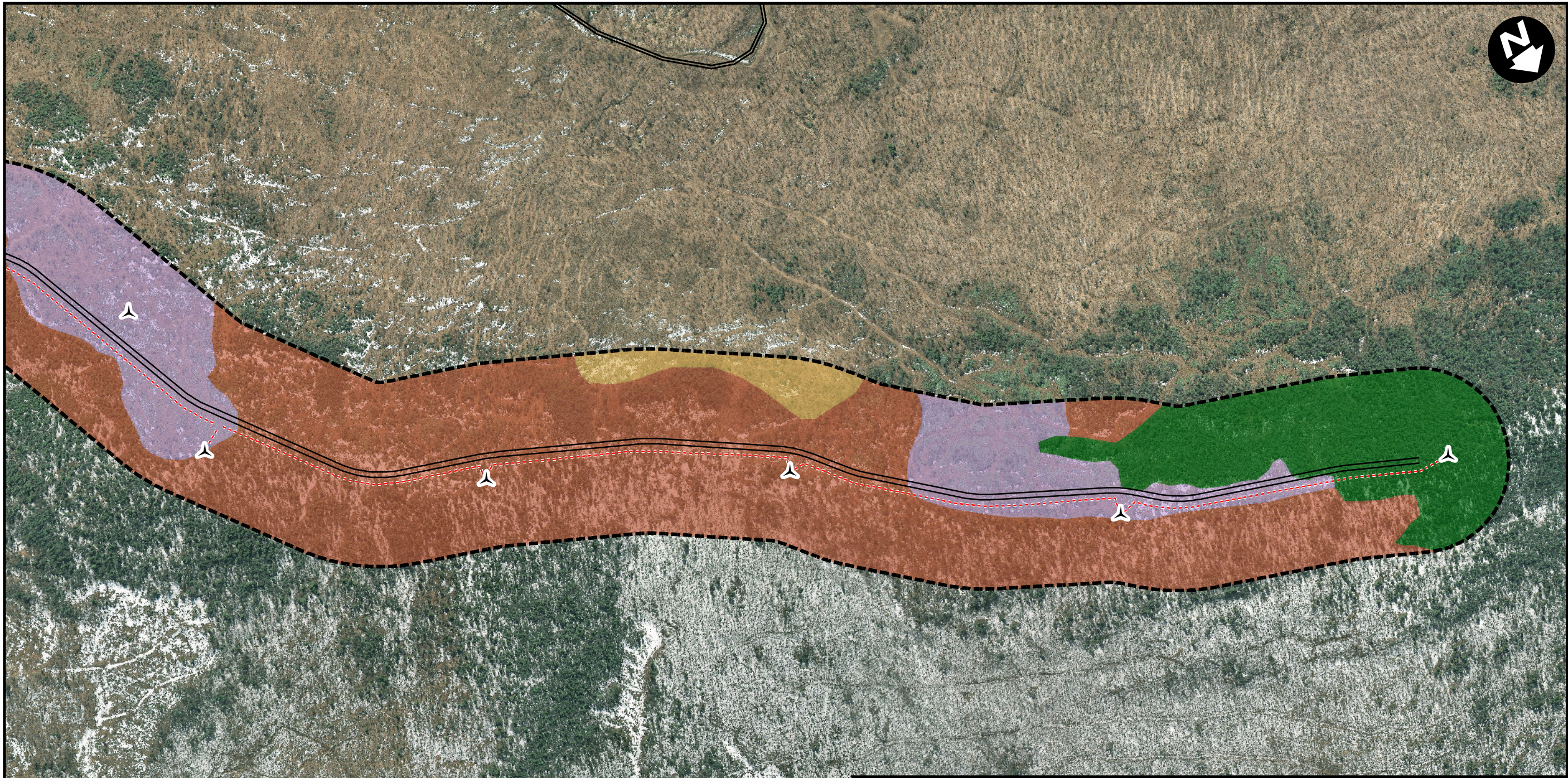
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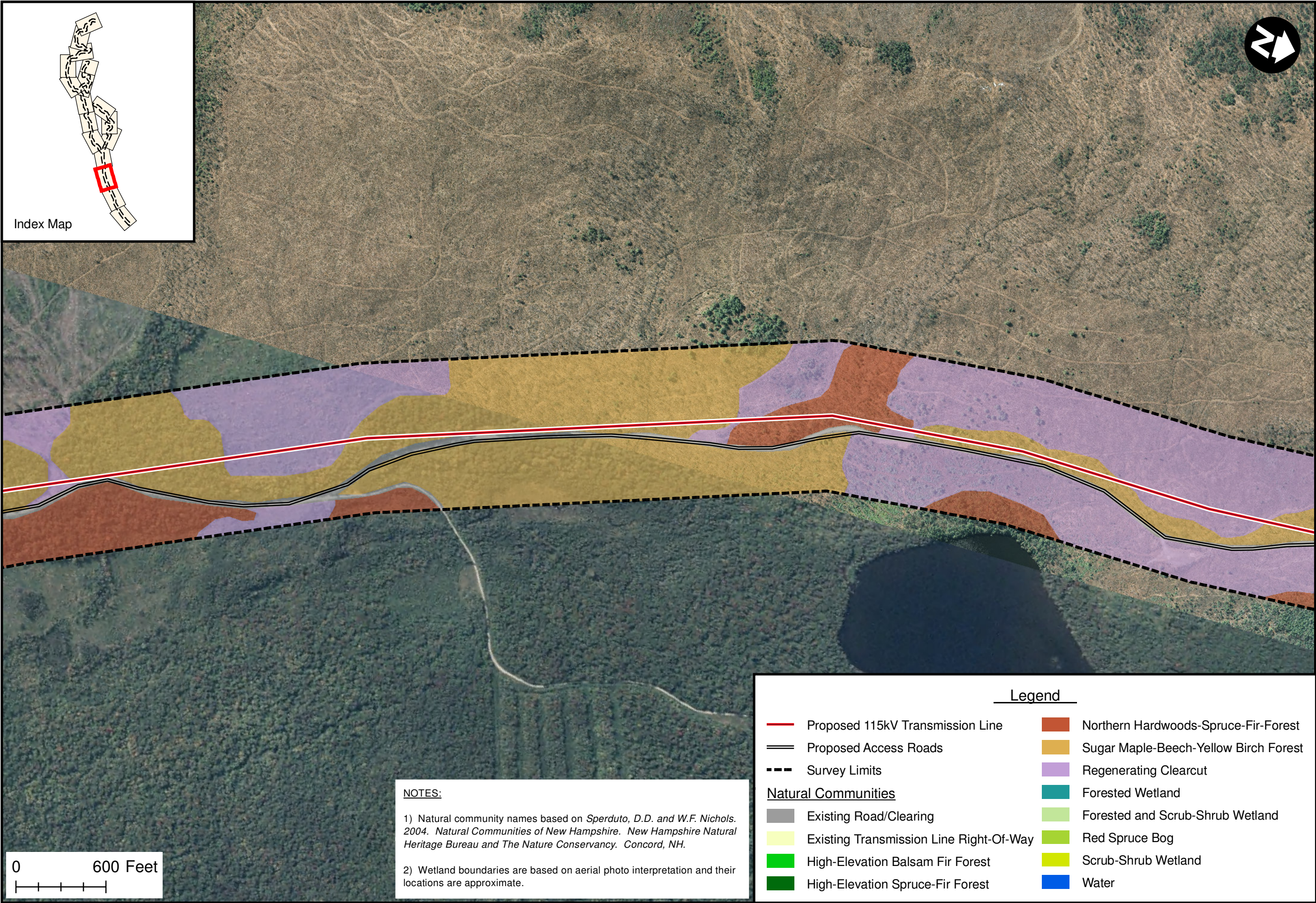
**NOTES:**

1) Natural community names based on *Sperduto, D.D. and W.F. Nichols. 2004. Natural Communities of New Hampshire. New Hampshire Natural Heritage Bureau and The Nature Conservancy. Concord, NH.*

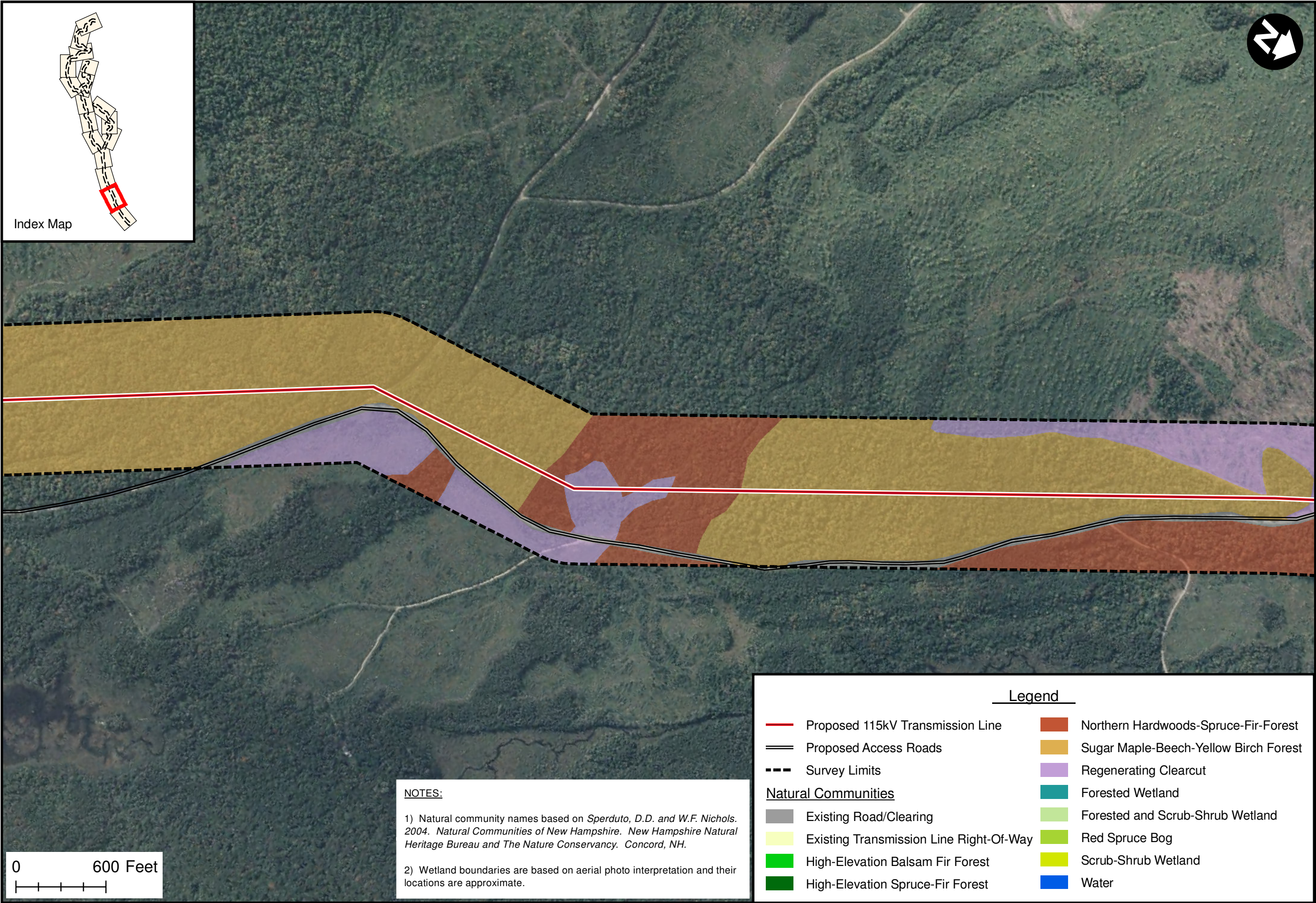
2) Wetland boundaries are based on aerial photo interpretation and their locations are approximate.

Legend	
	Proposed Turbine Location
	Proposed 35kV Underground Transmission Line
	Proposed Access Roads
	Survey Limits
Natural Communities	
	Existing Road/Clearing
	Existing Transmission Line Right-Of-Way
	High-Elevation Balsam Fir Forest
	High-Elevation Spruce-Fir Forest
	Northern Hardwoods-Spruce-Fir-Forest
	Sugar Maple-Beech-Yellow Birch Forest
	Regenerating Clearcut
	Forested Wetland
	Forested and Scrub-Shrub Wetland
	Red Spruce Bog
	Scrub-Shrub Wetland
	Water

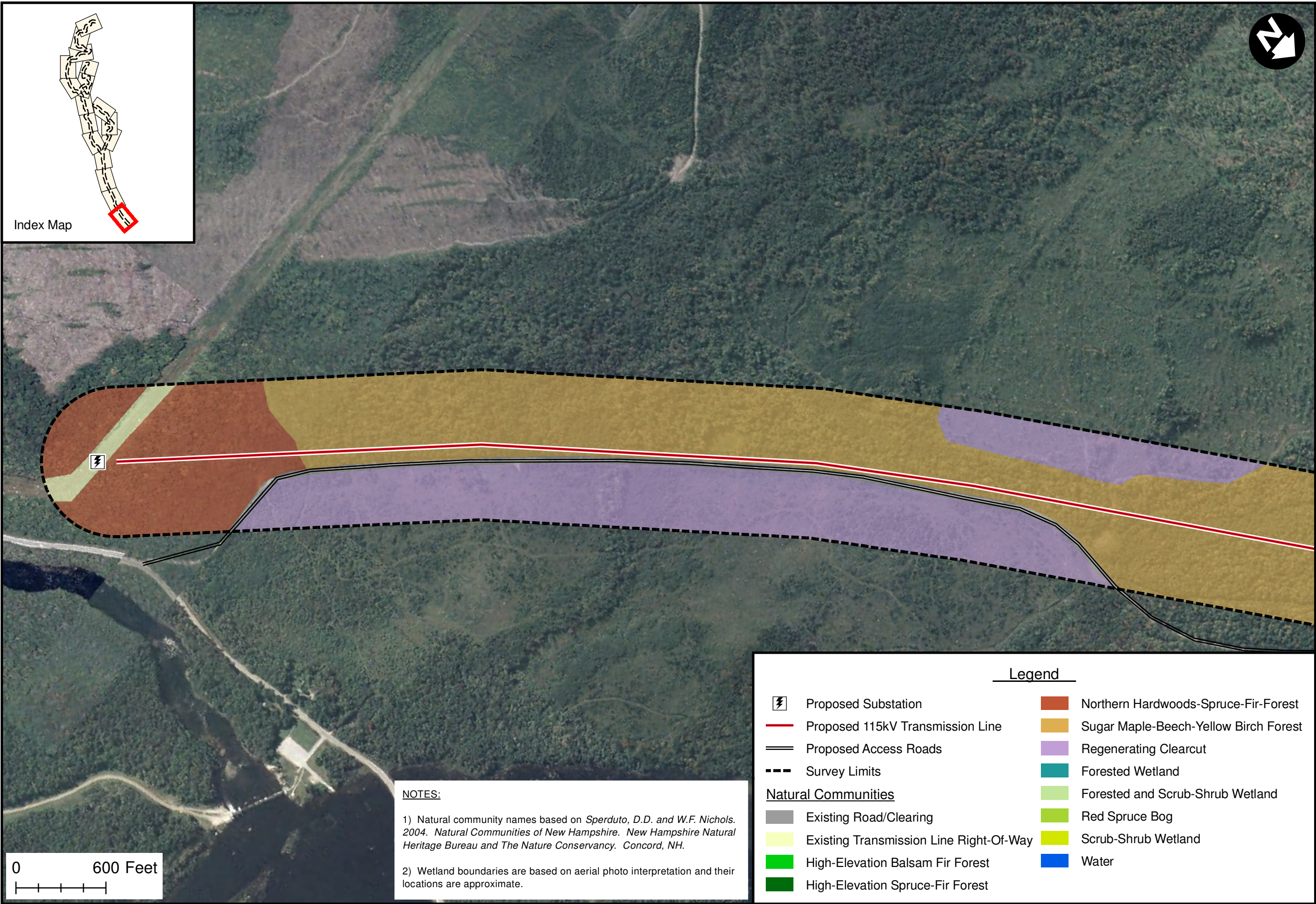




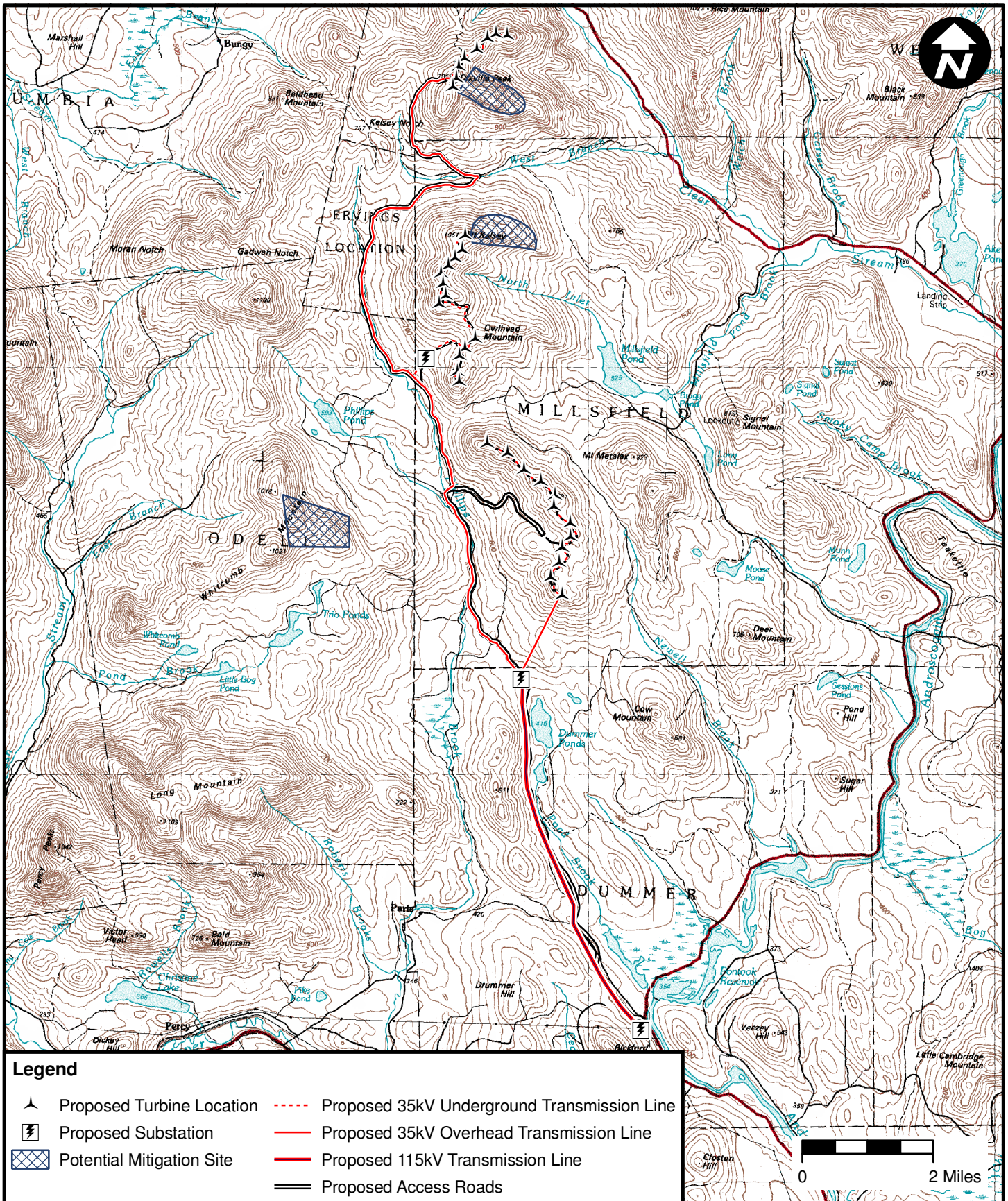












## **APPENDIX A**

### **REPRESENTATIVE PHOTOGRAPHS**





**Photo 1.** Dixville Peak High-Elevation Balsam Fir Forest.  
Stantec Consulting March 25, 2008



**Photo 2.** Dixville Peak High-Elevation Spruce-Fir Forest.  
Stantec Consulting March 25, 2008



**Photo 3.** Mt. Kelsey High-Elevation Balsam Fir Forest at north summit.  
Stantec Consulting March 25, 2008



**Photo 4.** Mt. Kelsey High-Elevation Spruce-Fir Forest at southern summit.  
Stantec Consulting March 25, 2008





**Photo 5.** Northern Hardwoods-Spruce-Fir Forest in saddle between Mt. Kelsey and Owlhead Mountain.  
Stantec Consulting March 25, 2008



**Photo 6.** Owlhead Mountain High-Elevation Spruce-Fir Forest near southern summit.  
Stantec Consulting March 25, 2008



**Photo 7.** Skidder trails through mixed forests on Fish Brook Ridge.  
Stantec Consulting March 25, 2008



**Photo 8.** Fish Brook Ridge view to southwest.  
Stantec Consulting March 25, 2008





**Photo 9.** Fish Brook Ridge southern summit area.  
Stantec Consulting March 25, 2008



**Photo 10.** Fish Brook Ridge Red Spruce Bog.  
Stantec Consulting March 25, 2008





**Photo 11.** Fish Brook Ridge Sugar Maple-Beech-Yellow Birch Forest below southern summit.  
Stantec Consulting March 25, 2008



**Photo 12.** Fish Brook Ridge clearcut.  
Stantec Consulting March 25, 2008



**Photo 13.** Looking northwest to Whitcomb Mountain summit from fire tower.  
Stantec Consulting March 25, 2008